

CLAIMS

What is Claimed is:

1. A method of controlling the spatial distribution of RF power used to generate a plasma for processing a semiconductor device, comprising the steps of:

(a) producing RF power;

(b) delivering the RF power to each of a plurality of separate electrode zones; and

(c) separately controlling the power delivered to each of the electrode zones so as to produce a desired spatial distribution of RF power in the area of the semiconductor device.

2. The method of Claim 1, wherein step (c) is performed by tuning each of a plurality of electrical circuits respectively associated with the zones.

3. The method of Claim 2, wherein step (b) includes capacitively coupling the power generated in step (a) to each of the zones.

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4. The method of Claim 3, wherein step (c) includes tuning each of the capacitors used to couple the power to the zones.

5. The method of Claim 1, including the step of forming the electrode zones by providing a plurality of electrodes on a chuck for holding the semiconductor device during processing.

6. The method of Claim 1, wherein step (a) is performed using a single source of RF power.

7. The method of Claim 1, including sensing the spatial distribution of RF power in a chamber used to process the semiconductor device, and wherein the RF power delivered in step (b) is controlled based on the sensed distribution.

8. The method of Claim 1, including electrically matching the RF power produced in step (a) with a network used to deliver the RF power in step (b).

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9. The method of Claim 1, including arranging a plurality of electrodes on an chuck used to hold the semiconductor device, and capacitively coupling the electrodes to an RF power source.

10. Apparatus for generating an RF power field used to produce a plasma, comprising:

an RF power generator;

an electrode having a plurality of separate electrode portions; and,

a circuit for connecting the generator with the electrode and for separately controlling the amount of RF power delivered from the generator to each of the electrode portions.

11. The apparatus of Claim 10, wherein the circuit includes a capacitor network for capacitively coupling the electrode portions with the RF generator.

12. The apparatus of Claim 11, including a matching network for electrically matching the RF generator with the capacitor network.

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13. The apparatus of Claim 11, wherein the capacitor network includes a plurality of variable capacitors each capacitively coupling the electrode portions with the RF generator.

14. The apparatus of Claim 13, wherein the connecting circuit includes a controller for tuning each of the capacitors.

15. The mask of Claim 13, wherein the electrode portions are concentric ring electrodes.

16. The apparatus of Claim 15, wherein the variable capacitors are respective coupled with the ring electrodes and are operable to capacitively couple RF power from the generator to the ring electrodes.

17. The apparatus of Claim 16, wherein the connecting circuit includes a controller for tuning the variable capacitors and thereby control the amount of power coupled to each of the ring electrodes.

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18. The apparatus of Claim 10, including a sensor for sensing information related to the spatial distribution of the plasma and for delivering the sensed information to the controller.

19. The apparatus of Claim 19, wherein the controller includes means for changing the RF power delivered to at least certain of the electrode portions based on the information delivered to the controller by the sensor.